

Nematodes of the family Neotylenchidae (Tylenchida:Nematoda) from the Canadian high Arctic¹

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Six species of nematodes in the family Neotylenchidae, including two new species, are reported from the Canadian high Arctic for the first time. *Hadrodemus* n. gen. is established for species similar to *Deladenus* Thorne, 1941, but with a more anterior vulva and a postuterine sac. *Deladenus saccatus* Andrassy, 1954 is transferred to this genus. *H. megacondylus* n. sp. and *Nothotylenchus attenuatus* n. sp. are described and illustrated. Measurements and illustrations of the known species *N. acris*, *N. acutus*, *N. danubialis*, and *Stictylus mucronatus*, and a taxonomic key to the nominal species of these genera, are provided.

During June-August 1962 I collected soil samples from the Lake Hazen area of Ellesmere Island (81°49' N., 71°18' W.) in the Northwest Territories, Canada. Several of these samples contained nematodes belonging to the family Neotylenchidae, a stylet-bearing nematode. The present paper presents descriptions of one genus and two species new to science and four already described species. Das (1964) previously reported two species, *Hexatylus mulveyi* Das, 1964 and *Deladenus durus* (Cobb, 1922) Thorne, 1941, from the Lake Hazen area.

Specimens were killed by the judicious application of heat, fixed for at least 24 hours in 5% formol, after which permanent glycerin mounts were eventually prepared. Measurements were made by means of a "Visopan" projection microscope. Illustrations were prepared from camera lucida drawings. All type material is maintained in the Canadian National Collection of Nematodes (CNCN) at Ottawa, Canada.

Taxonomy

GENUS *Hadrodemus* N. GEN.

Definition

Esophagus joining intestine immediately behind nerve ring; esophageal glands lying free in body. Vulva well posterior to mid-body. Female monodelphic, prodelphic, ovary outstretched. Postuterine sac present. Male unknown.

¹An investigation associated with the program studies on Arctic insects, Entomology Research Institute, Canada Department of Agriculture (Paper No. 39).

TYPE SPECIES: *Hadrodemus megacondylus* n. sp.

Differential Diagnosis

Hadrodemus n. gen. differs significantly from *Deladenus* Thorne, 1941 in the more anterior position of the vulva and in having a postuterine sac which is absent in the latter.

Hadrodemus is derived from the Greek *hadros* (well-developed) and *adenos* (gland) and is masculine in gender.

Species Transferred to *Hadrodemus*

Hadrodemus saccatus (Andrassy, 1954) n. comb.

Deladenus saccatus Andrassy, 1954

Andrassy (1954; 1957) described and illustrated the female of this species and assigned it to the genus *Deladenus*. However, it differs significantly from all species of *Deladenus* in the position of the vulva (79-80% vs. 90% for all other species of *Deladenus*) and in possessing a postuterine sac.

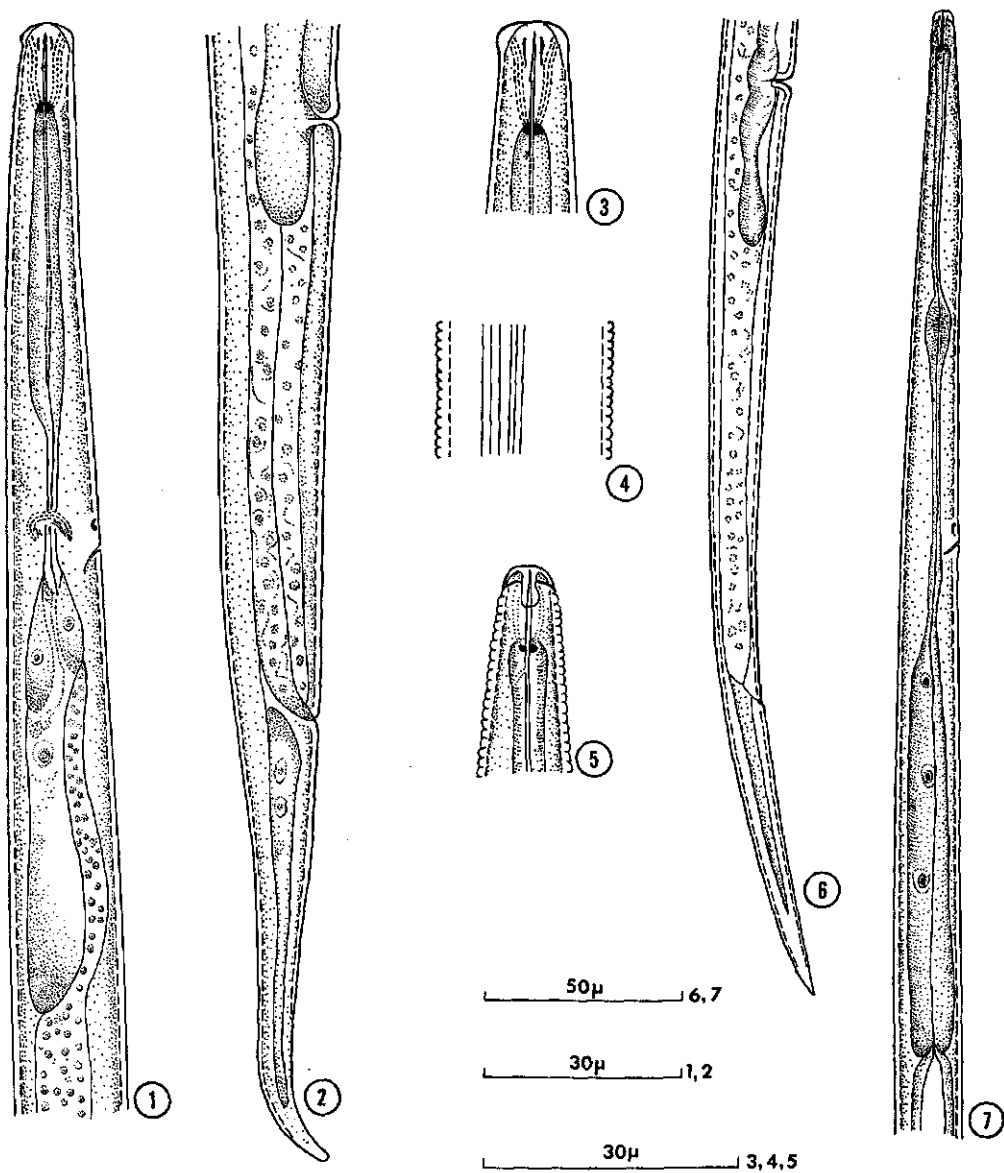
Hadrodemus megacondylus n. sp.

(Figs. 1-4)

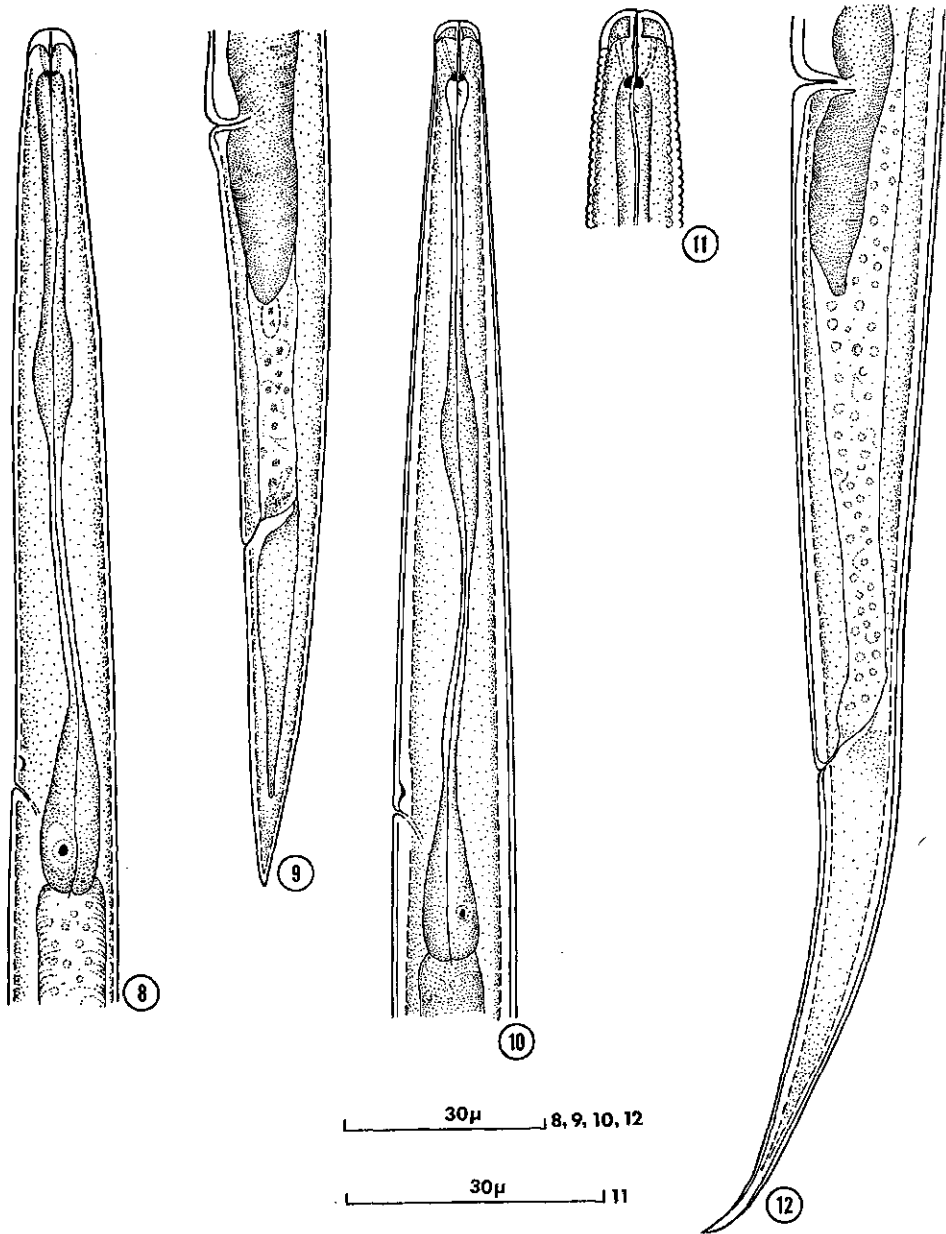
(1 female)— $L = 0.73$ mm; $a = 38$; $b = 4.3$; $c = 10$; $V = 79$; stylet length = 11μ ; $T/ABD = 5.5$.

Female (holotype)— $L = 0.72$ mm; $a = 38$; $b = 4.2$; $c = 10$; $V = 77$; stylet length = 11μ ; $T/ABD = 5.5$. Collection No. 3064, CNCN, Ottawa, Canada. Type slide No. 188 deposited in the CNCN, Ottawa, Canada.

Head slightly set off from body, cuticle finely annulated. Spear with large knobs. Dorsal



FIGS. 1-4. *Hadrodenus megacondylus* n. gen., n. sp. Female. 1. Anterior area. 2. Posterior area. 3. Head. 4. Lateral area, incisures. FIGS. 5-7. *Nothotylenchus attenuatus* n. sp. Female. 5. Head. 6. Posterior area. 7. Anterior area.



FIGS. 8, 9. *Nothotylenchus acris*. Female. 8. Anterior area. 9. Posterior area. FIGS. 10-12. *Nothotylenchus acutus*. Female. 10. Anterior area. 11. Head. 12. Posterior area.

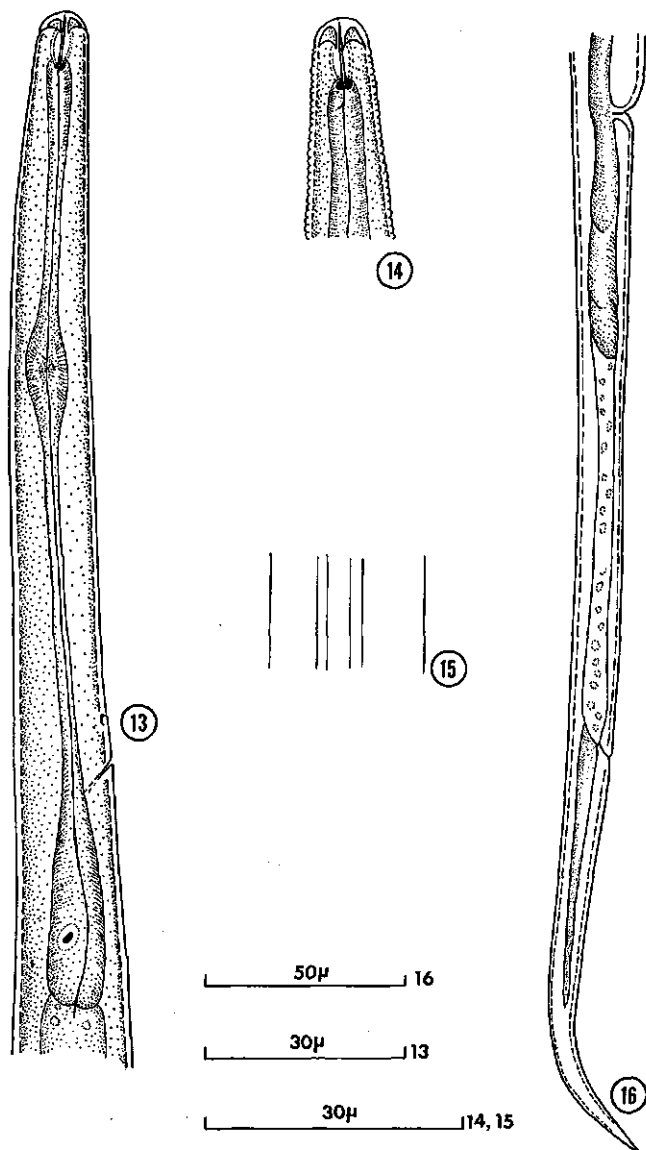
esophageal gland very large, ventral glands relatively small. Lateral field occupying about one-quarter body width, incisures six.

Female monodelphic, prodelphic, ovary outstretched. Vulval lips slightly elevated. Postuterine sac extending posteriad about one vulval body diameter. Anal-vulval distance about $1\frac{1}{2}$ times tail length. Tail conoid with acutely rounded terminus. Male unknown.

Differential Diagnosis

H. megacondylus n. sp. differs from *H. saccatus* (Andrássy) in having relatively large stylet knobs which, according to Andrássy (1954; 1957), are small in his species. In addition the tail of *H. saccatus* has a pointed terminus while that of *H. megacondylus* is acutely rounded.

Paratype—One female, in CNCN, Ottawa, Canada.



FIGS. 13-16. *Nothotylenchus* sp., near *N. danubialis*. Female. 13. Anterior area. 14. Head. 15. Lateral area, incisures. 16. Posterior area.

Type locality and habitat—Northeast slope of Mount McGill, Lake Hazen area, Ellesmere Island, N.W.T., Canada, about the roots of grass.

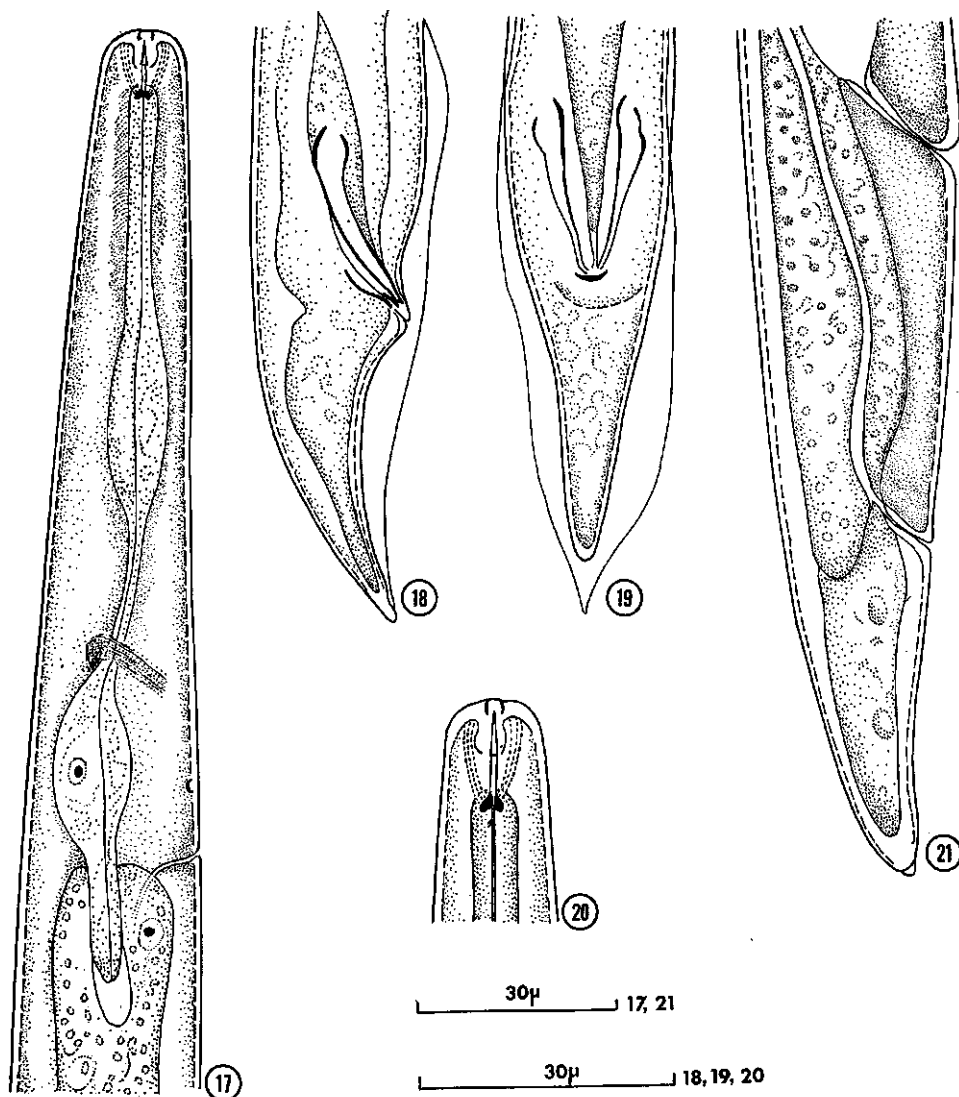
GENUS *Nothotylenchus* THORNE, 1941
Nothotylenchus attenuatus n. sp.

(Figs. 5-7)

(4 females)— $L = 0.90$ mm (0.82-0.96); $a = 55$ (53-57); $b = 3.7$ (3.4-4.0); $c = 14.4$ (13-16); $V = 75$ (74-76); tail length = 65μ ; esophageal length = $240-260 \mu$; stylet length = $9-10 \mu$.

Female (holotype)— $L = 1.07$ mm; $a = 59$; $b = 3.7$; $c = 16$; $V = 77$; tail length = 65μ ; esophageal length = 290μ . Collection No. 3034 CNCN, Ottawa, Canada. Type slide No. 189; deposited in CNCN, Ottawa, Canada.

Head slightly offset, stylet with medium-sized basal knobs. Enlarged basal area of esophagus (basal esophageal bulb, elongate cylindroid) occupying about one-third of total esophageal length. Excretory pore about eight body diameters anterior to base of esophagus or nearly midway. Lateral incisures four.



FIGS. 17-21. *Stictylus mucronatus*. 17. Anterior area, female. 18. Lateral view of tail, male. 19. Dorsoventral view of tail, male. 20. Head, female. 21. Posterior area, female.

Female monodelphic, prodelphic, ovary outstretched to near base of esophagus. Vulval labia distinctly elevated, postuterine sac length slightly more than twice vulval body diameter.

Tail conoid with pointed terminus, length about one-third anal vulva distance. Male unknown.

Differential Diagnosis

N. attenuatus n. sp. differs from other species in this genus in having a significantly more slender body and a more anteriorly located excretory pore. It differs from *N. acris*, its closest relative, in esophageal length (240 μ vs. 140 for *N. acris*) and body width ($a = 33$ for *N. acris* and 53–59 for *N. attenuatus*).

Paratypes—Four ♀♀ deposited in the CNCN, Ottawa, Canada.

Type habitat and locality—Marshy area, wet grass, and moss, near Skeleton Lake. Collection No. 3034.

Nothotylenchus acris Thorne, 1941

(Figs. 8–9)

(1 female)— $L = 0.77$ mm; $a = 43$; $b = 6.2$; $c = 15$; $V = 82$; stylet length = 7 μ ; tail length = 50 μ .

Thorne (1941) described this species. The single female from the Lake Hazen area, with the exception of minor variations in tail/anus-vulva distance and position of the excretory pore, fits his description well.

Habitats—About the roots of grass. Collection No. 3038.

Nothotylenchus acutus Khan, 1965

(Figs. 10–12)

(1 female)— $L = 0.7$ mm; $a = 37$; $b = 5.4$; $c = 9.7$; $V = 73$; stylet length = 9 μ ; tail length = 72 μ .

This species was described and illustrated by Khan (1965). The Lake Hazen specimen fits his description well with the exception of the body width ($a = 22$ –28 for *N. acutus*).

Habitat—About the roots of wild hay. Collection No. 3061.

Nothotylenchus sp. near *N. danubialis*

Andrássy, 1960

(Figs. 13–16)

(1 female)— $L = 1.0$; $a = 60$; $b = 6.3$; $c = 10$; $V = 76$; stylet length = 9 μ ; tail length = 100 μ .

Head rounded, not set off from body. Stylet slender with small basal knobs. Lateral field occupying one-third body width, incisures four.

Ovary outstretched, reaching nearly to base of esophagus. Postuterine sac extending posteriorly to a distance of four vulval body diameters. Tail conoid with a very finely pointed terminus.

The Lake Hazen specimen closely resembles *N. danubialis*, described by Andr assy (1960), but differs in the position of the excretory pore (more posterior in *N. danubialis*), in having a more slender body ($a = 45$ for *N. danubialis*), and in tail shape.

Habitat—About the roots of grass growing in a dry pond bed. Collection No. 3048.

GENUS *Stictylus* THORNE, 1941

Stictylus mucronatus Thorne and Malek, 1968

(Figs. 17–21)

(9 females)— $L = 1.06$ mm (0.9–1.2); $a = 36$ (26–44); $b = 5.4$ (4.9–6.2); $c = 27$ (23–30); $V = 91$ (90–92); spear length = 11–12 μ ; $T/ABD = 1.3$.

(2 males)— $L = 0.86, 0.92$ mm; $a = 25$; $b = 34, 37$; $c = 24, 28$; spear length = 10 μ ; spicule length = 22 μ .

Thorne and Malek (1968) first described and illustrated the female of this species. The Lake Hazen specimens conform closely to their description. (Thorne and Malek gave a c -value of 10 for their species; however, this should be about 22, according to their illustration, Fig. 36G).

Reproductive tract of female very similar to that described and illustrated for *S. macrocellus* by Anderson and Das (1967). The intestine dorsally overlaps the rectum in the Lake Hazen specimens and a small terminal mucro is present on the tail of all specimens.

Male with reproductive apparatus characteristic of species in this genus. This is the first report of a male for this species.

Habitats—About the roots of *Dryas* sp. Collection No. 3754, collected in 1966 by Mr. W. R. Forrest, Entomology Research Institute, Ottawa, Canada.

Key to the Species of *Nothotylenchus*
(Females)

1. Postuterine sac length 4-6 times vulval body diameter.....*danubialis* Andr ssy
Postuterine sac length 2 times or less than vulval body diameter.....2
2. Tail terminus peg-like, lateral field with five incisures.....*thornei* Andr ssy
Tail terminus pointed or acutely rounded, lateral field with either four or six incisures.....3
3. Lateral field with four incisures.....4
Lateral field with six incisures.....15
4. Postuterine sac length about twice vulval body diameter.....5
Postuterine sac length slightly more than or less than vulval body diameter.....8
5. Excretory pore about midway from base of esophagus, body relatively thin ($a = 53-59$).....
Excretory pore near base of the esophagus, body thick ($a = 39$ or less).....6
.....*attenuatus* n. sp.
6. Tail short ($c = 15-16$), $V = 76-84\%$*acris* Thorne
Tail long ($c = 8-11$), $V = 70-76\%$7
7. Tail terminus pointed, excretory pore about nine annules (less than one body width) anterior to base of esophagus.....*acutus* Khan
Tail terminus acutely rounded, excretory pore about 23 annules anterior (greater than two body diameters) to base of esophagus.....*basiri* Khan
8. Tail relatively short ($c = 10-17$), $V = 75-90\%$9
Tail relatively long ($c = 6-8$), $V = 64-72\%$12
9. Basal bulb comprising half the length of the esophagus, excretory pore nearly midway in esophagus.....*cylindricollis* Thorne
Basal bulb comprising one-quarter length of the esophagus, excretory pore well posterior in esophagus.....10
10. Postuterine sac length about one-half vulval body diameter, tail terminus pointed.....*drymocolus* Ruehm
Postuterine sac length slightly more than one vulval body diameter, tail terminus acutely rounded..11
11. Basal bulb elongate-cylindroid, excretory pore about three body diameters anterior to base of esophagus.....*cylindricus* Khan & Siddiqi
Basal bulb pyriform, excretory pore about one body diameter anterior to base of esophagus.....*alii* Khan & Siddiqi
12. Spear length about 12 μ , tail length one-half anus-vulva distance.....*innuptus* Andr ssy
Spear length 8 μ or less, tail length about equal to anus-vulva distance.....13
13. Tail terminus acutely rounded.....*loksai* Andr ssy
Tail terminus pointed.....14
14. Spear length 5 μ , head rounded.....*exiguus* Andr ssy
Spear length 7 μ , head truncated.....*antricolus* Andr ssy
15. Tail terminus pointed, body fairly fat ($a = 24$) posterior expansion of esophagus about 30% of esophageal length.....16
Tail terminus acutely rounded, body relatively thinner ($a = 28-35$) posterior expansion of esophagus about 20% of esophageal length.....17
16. Postuterine sac length equal to vulval body diameter, $V = 84\%$*similis* Thorne & Malek
Postuterine sac length about 2½ times vulval body diameter, $V = 71\%$*buckleyi* Das
17. Tail terminus bluntly rounded, $V = 71\%$, postuterine sac length about three-quarters of vulval body diameter.....*affinis* Thorne
Tail terminus acutely rounded, $V = 76-83\%$, postuterine sac length equal to or twice vulval body diameter.....18

